U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: *Brickellia mosieri* (Small) Shinners

COMMON NAME: Florida brickell-bush or Mosier's false boneset

LEAD REGION: 4

INFORMATION CURRENT AS OF: October 2005

STATUS/ACTION:

___ Species assessment - determined species did not meet the definition of endangered or threatened under the Act and, therefore, was not elevated to Candidate status
___ New candidate
_X_ Continuing candidate
__ Non-petitioned
_X_ Petitioned - Date petition received: May 11, 2004
__ 90-day positive - FR date:
__ 12-month warranted but precluded - FR date:
__ Did the petition request a reclassification of a listed species?
FOR PETITIONED CANDIDATE SPECIES:
a. Is listing warranted (if yes, see summary of threats below)? yes
b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? yes
c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded. We find that the immediate issuance of a proposed rule and timely promulgation of a final rule for this species has been, for the preceding 12 months, and continues to be, precluded by higher priority listing actions (including candidate species with lower LPNs). During the past 12 months, almost our entire national listing budget has been consumed by work on various listing actions to comply with court orders and court-approved settlement agreements, meeting statutory deadlines for petition findings or listing determinations, emergency listing evaluations and determinations, and essential litigation-related, administrative, and program management tasks. We will continue to monitor the status of this species as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures. For information on listing actions taken over the past 12 months, see the discussion of "Progress on Revising the Lists," in the current CNOR which can be viewed on our Internet website (http://endangered.fws.gov/).
___ Listing priority change
Former LP: ___

New LP: ___

Date when the species first became a Candidate (as currently defined): October 25, 1999

___ Candidate removal: Former LP: ___

___ A - Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F - Range is no longer a U.S. territory.

___ I - Insufficient information exists on biological vulnerability and threats to support listing.

___ M - Taxon mistakenly included in past notice of review.

___ N - Taxon may not meet the Act's definition of "species."

___ X - Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Flowering Plants, Asteraceae (Compositae), Aster Family

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Florida, U.S.A.

CURRENT STATES/ COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Florida, Miami-Dade County, U.S.A.

LAND OWNERSHIP: All of the 17 sites (including the Army Reserve site) confirmed to have this species are owned or managed by Miami-Dade County, except for one owned by the Florida Department of Transportation (not a conservation area), and another that is privately owned.

LEAD REGION CONTACT: Richard Gooch, 404-679-7124

LEAD FIELD OFFICE CONTACT: David Martin, 772-562-3909, ext 230

BIOLOGICAL INFORMATION:

Species Description: Perennial herb 1-3.5 feet (0.3-1.1 m) tall, slender, erect, and branching. Leaves 0.4-1.2 inches (1-3 cm) long, alternate, narrow, linear, thick, usually spreading or curved downward, entire or slightly toothed, resin-dotted. It is a member of the aster family (Asteraceae). The flower heads are in loose, open clusters at the ends of branches. Disk flowers white in small, dense heads surrounded by hairy, slightly ribbed bracts; no ray flowers, although long style branches (white, sometimes brown) may appear to be rays (Florida Natural Areas Inventory 2004). "Flowering takes place primarily in the fall (August-October), but individuals may be found in flower most of the year." (Bradley and Gann 1999).

Taxonomy: *Brickellia mosieri* was first described by John Kunkel Small (1933) as *Kuhnia mosieri*, with the type specimen from Ross-Costello hammock, Dade County, Florida (specimen and herbarium: Small, Mosier, & Small No. 6544, NY). It, and all other members of the genus *Kuhnia*, was transferred to the genus *Brickellia* by Lloyd Shinners (1971). Wunderlin and Hansen (2003) continue to treat this species as *B. mosieri*, a Florida endemic. Two systematists have treated it as a variety of *Kuhnia* (or *Brickellia*) *eupatorioides*, a relatively widespread species. The first to do so was Long (1970), who provided a new name, making it *Kuhnia eupatorioides* var. *floridana*. Billie Turner's (1989) study of the *Brickellia eupatorioides* complex treated it as *Brickellia eupatorioides* (L.) Shinners var. *floridana* (R.W. Long) B. L. Turner (Bradley and Gann 1999).

Habitat: "*B. mosieri* is found exclusively in pine rocklands. . . . The pine rockland habitat where it occurs in Miami-Dade County requires periodic fires to maintain and open sunny understory with a minimum amount of hardwoods. It tends to occur in areas within open shrub canopy and exposed limestone with minimal organic litter (pine needles, leaves, and other organic materials). Some populations are found at relatively high elevations (ca. 3-4 meters [or 9-13 feet]), one occurrence is in a low elevation pine rockland very close to a marl prairie (2-3 meters [or 6-9 feet]). The pine rockland which contains this occurrence may have flooded periodically during the summer wet season. Periodic fires are extremely important in maintaining this ecosystem. The natural fire regime was probably 3-7 years, with most fires occurring at the beginning of the wet season in spring and early summer. These periodic fires keep the shrub canopy low and reduce litter accumulation." (Bradley and Gann 1999).

Historical Range/Distribution: "*B. mosieri* is endemic to Miami-Dade County on the Miami Rock Ridge. It was historically distributed from central and southern Miami-Dade County from South Miami (latitude ca. 25º 42.5) to Florida City (latitude 25º 26.0). This is a range of approximately 22.5 miles along the Miami Rock Ridge. Herbarium specimens have not been studied from the New York Botanical Garden, so the full extent of its historic range is unknown." (Bradley and Gann 1999). Bradley and Gann (1999) provided a list of herbarium specimens and other records for this plant that do not give precise or accurate location information. In these cases, the localities have almost certainly been destroyed because they were located in Miami-Dade County.

Current Range/Distribution: The current range is central and southern Miami-Dade County from SW 120 Street (latitude 25º 39.4) to Florida City (Bradley and Gann 1999). Bradley and Gann (1999, 2004) cited extant occurrences at these sites, which are managed by Miami-Dade County unless otherwise noted: Camp Choee (private), Camp Owaissa Bauer, Ingram Pineland, three adjoining properties at the Richmond pinelands (Larry and Penny Thompson Park, Luis Martinez United States Army Reserve Station [grounds managed by Miami-Dade County] and Miami Metrozoo), Navy Wells Pineland, Nixon Smiley Pineland Preserve, Panther Pineland (reported 1999 only), Pine Shore Preserve, Quail Roost Pineland, Rockdale Pineland, Ron Ehman Park, Seminole Wayside Park, Tamiami Pineland Complex Addition, Florida Turnpike Extension at 93rd Terrace (Florida Department of Transportation, not considered a conservation area), and West Biscayne Pineland. In 2005, this species was found at the two-acre Porter Russell Preserve, owned by the Tropical Audubon Society in Goulds at 124 Avenue and 222

Street (K. Bradley, The Institute for Regional Conservation, in litt. 2005).

In addition to these 17 sites, (16 in conservation areas), Alan Herndon reported 18 occurrences in an undated report (Bradley and Gann 1999). Six of Herndon's occurrences have been developed. Several additional sites have been disturbed, or, because of lack of management, the sites are now dominated by exotic pest plants and/or dense hardwoods. Florida brickell-bush may no longer occur at some of these stations (Bradley and Gann 1999). The Institute for Regional Conservation mapped all the public and many private pinelands in Miami-Dade County outside of Everglades National Park in 2004. They found no new sites for this plant, other than at the Porter Russell Preserve.

Population Estimates/Status: Larry and Penny Thompson Park has the only large population, estimated to comprise 1,001-10,000 individuals. Navy Wells Pineland has 101-1,000 plants. These populations were estimated to have 11-101 plants: Camp Choee, Camp Owaissa Bauer, Navy Wells, Rockdale, Ron Ehman Park, Seminole Wayside Park, Tamiami, and West Biscayne. Fewer than 10 plants existed at Panther, Pine Shore, and the Turnpike Extension site (Bradley and Gann 1999). Population estimates are not available for Ingram, Luis Martinez Army Reserve Station, Miami Metrozoo, Nixon Smiley, Porter Russell, or Quail Roost, but none of these populations are believed to be large.

Bradley and Gann (1999) estimated populations of pineland plants using a logarithmic scale. On that scale, the total population of *Brickellia mosieri* was estimated at 1,001-10,000 plants, with the exact number probably between 5,000 and 7,000 plants. They also stated that the population of *B. mosieri* was probably declining because "private sites where this plant occurs are either not being managed or are being developed. Populations on public lands are also being impacted." This remains the best available estimate of population size. During 2004, the natural forest communities (pinelands and hardwoods) of Miami-Dade County were mapped, including public lands and private lands where the county government obtained landowners' permission or determined that it was not necessary. This mapping did not disclose any new populations. In addition to the mapping of forest communities, selected populations of plants are now being mapped at public sites. The population mapping will provide a more detailed assessment of the species' status.

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

About 99 percent of the former habitat of this narrowly endemic plant has been converted to farm and urban land in Miami-Dade County. Pine rocklands in Miami-Dade County have been reduced to about 11 percent of their former extent (Kernan and Bradley 1996). Of the estimated historical extent of 74,000 hectares (ha) (182,780 acres), only 8,140 ha (20,106 acres) of pine rocklands remained in 1996. Much of the remaining pineland is in Everglades National Park, but the range of Florida brickell-bush does not extend into the Park. Much of the remaining pinelands are in small remnant blocks isolated from other natural areas (Herndon 1998). Miami-Dade County has developed a network of small public conservation lands, and has encouraged conservation of natural vegetation on private land. The County's actions may have averted extinction of this and other

pineland plants. More accurate estimates of the areas and conditions of the sites occupied by *Brickellia mosieri* are being developed. Bradley and Gann (1999) noted that all the sites they inspected had been modified by fire suppression and invasion by exotic pest plants. This was an incentive for the surveys that began in 2004.

B. Overutilization for commercial, recreational, scientific, or educational purposes. None known.

C. Disease or predation. None known.

D. The inadequacy of existing regulatory mechanisms. The Florida Department of Agriculture and Consumer Services designated *Brickellia mosieri* as endangered under Chapter 5B-40, Florida Administrative Code. This listing provides little or no habitat protection beyond the State's Development of Regional Impact process, which discloses impacts from projects, but provides no regulatory protection for plants listed by the Florida Department of Agriculture and Consumer Services or other State agencies on private lands. Without local or county ordinances preventing the destruction of the plant, conservation does not occur.

E. Other natural or manmade factors affecting its continued existence. Fire suppression and exotic plant invasions are the greatest threats to *Brickellia mosieri*. Fire is required to maintain the pine rockland community. Under natural conditions, lightning fires typically occurred at 3- to 7-year intervals. With fire suppression, hardwoods invade pine rocklands and shade out understory species like *Brickellia mosieri*. Fire suppression has reduced the size of the areas that do burn and habitat fragmentation prevents fire from moving across the landscape in a natural way. Thus, many pine rockland communities are becoming tropical hardwood hammocks. For example, at Camp Owaissa Bauer, exotic pest plant and hardwood incursion into the pinelands has occurred, reducing the amount of suitable habitat for *Brickellia mosieri*.

Exotic species have altered the type of fire that occurs in pine rocklands. Historically, pine rocklands had an open low understory where natural fires remained patchy with low temperature intensity, thus sparing many native plants such as *Brickellia mosieri.* Dense infestations of exotic plants like Burma reed (*Neyraudia neyraudiana*) cause higher fire temperatures and longer burning periods, such that vegetation maintenance through fire alone will not be possible.

Bradley (in litt. 2005) comments that mechanical treatment (e.g., hand-held power tools) is often required prior to fire. The biggest exotic problems affecting this species are Burma reed and Brazilian pepper (*Schinus terebinthifolius*). With too much growth of these species it is impossible to conduct a safe burn because it will be too hot. After a period of fire suppression in pine rocklands, it also becomes necessary to control invading native hardwoods mechanically. As with exotics, excess growth of native hardwoods would result in a hot fire which can be destructive. Mechanical treatments cannot entirely replace fire because pine trees, understory shrubs, grasses, and herbs all

contribute to an ever-increasing duff layer. When this layer becomes thick, it covers the herbs and prevents most seeds from germinating. Duff will continue to accumulate even if hardwoods are removed mechanically. In addition, the ashes left by fires provide important post-fire nutrient cycling, which is lost with mechanical removal.

Other exotic plant taxa also affect pine rocklands. At least 277 taxa of exotic plants are now known to have invaded pine rocklands throughout south Florida (U.S. Fish and Wildlife Service 1998). Management of pine rocklands in Miami-Dade County is complicated because all of the remnants are small, fragmented areas bordered by urban development. Areas near the managed pine rockland that contain exotic species can act as a seed source of exotics allowing them to continue to invade the pine rockland (Bradley and Gann 1999).

Based on the low number of individuals in existence, within a narrow range, catastrophic events such as hurricanes may negatively affect *Brickellia mosieri*, either from storm damage or post-storm damage such as debris dumping in wooded areas, which was a problem after Hurricane Andrew in 1992.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

In 1979, Miami-Dade County enacted the Environmentally Endangered Lands Covenant Program which gives private land owners of pine rockland habitat a tax break if they agree to not develop the property and manage it for a period of ten years (U.S. Fish and Wildlife Service 1998). To help implement this program, the County recently had public and privately-owned natural forest communities (including pine rocklands and tropical hammocks) mapped, using geographic positioning methods. The County has acquired nearly all of the pineland remnants that were available for purchase and is managing them as a network of conservation lands. Initial exotic pest plant control has been conducted at many sites and the County, working with the Florida Division of Forestry, routinely conducts prescribed fires in pinelands, even in urban neighborhoods.

SUMMARY OF THREATS (including reasons for addition or removal from candidacy, if appropriate)

Nearly all of the pine rockland habitat within the narrow range of *Brickellia mosieri* has been urbanized, converted to agricultural use, or neglected, so that the original low understory has been replaced by hardwoods or exotic pest plants. Only a small number of individuals still exist, in a handful of small sites. This species is further threatened by fire suppression.

For species that are being removed from candidate status:

___Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

The primary conservation measures are to conserve pine rocklands through purchase or conservation easements, restoration of understories by removing exotic pest plants or hardwoods, and providing regular prescribed burns to maintain and restore the historic low understory. Monitoring of *Brickellia mosieri* populations is also needed.

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	**Imminent**	Monotypic genus	7
		Species	**8***
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: Only one relatively large population (up to 10,000 individuals) is known to exist, plus 16 other populations that do not exceed 100 individuals. There is little likelihood of finding more populations, because less than one percent of the original pineland habitat still exists in the Miami-Dade urban area, and this habitat has been mapped and surveyed for rare plants over the past two years. Throughout its range, this species is threatened by exotic pest plants and by conversion of pinelands to other uses. New exotic pest plants are expected to emerge, even as effective control methods are found for existing pests. However, 15 of the 17 sites are on conservation lands where control of invasive species is being implemented and controlled burns are being conducted. Thus, the overall magnitude of threat is moderate.

Imminence: In the limited area of protected conservation lands, fire suppression is a problem due to the difficulty of conducting prescribed fires in urban areas. Nonnative plant species also pose a threat and are difficult to control; Miami-Dade sites require regular maintenance to control these nonnative plant species. Thus threats are imminent.

Rationale for Change in Listing Priority Number (insert if appropriate): N/A

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. This plant persists primarily on county-owned conservation lands. There are no threats of such urgency or kind (such as collecting) that require immediate protection.

DESCRIPTION OF MONITORING: Based upon the most current information, the Florida brickell-bush is restricted to pinelands in Miami-Dade County (Bradley and Gann 1999). Most if not all of the populations have low densities of plants, of the known occurrences only two are believed to contain more than 1,000 individuals (Bradley and Gann 1999). The total population is estimated at between 5,000 and 7,000 plants, and the species appears to be declining (Bradley and Gann 1999). Private sites where this plant occurs are either not being managed or are being developed, and populations on public lands are being impacted (Bradley and Gann 1999).

Miami-Dade County sponsored a project to map public and private natural forest communities. The Institute for Regional Conservation has conducted the field work for this project with geographic information assistance from the Service. This project provides a list of plant species for each site, which updates distribution information. The mapping project shows that most of the larger public pinelands are in good condition, including Larry and Penny Thompson Park, the site that, with adjacent publicly-owned properties, has the largest known population of this species. Because this species is restricted to fire-maintained habitats, we expect, pending further information from the mapping project that Florida brickell-bush has benefited from Miami-Dade County's Environmentally Endangered Lands program.

Publicly-owned sites are actively managed to maintain pine rockland vegetation. Most of the larger publicly-owned pinelands, including Larry and Penny Thompson Park, are regularly burned, while others cannot currently be burned due to excessive growth of native plants. The Miami-Dade government is arranging long-term (at least 10 years) financing for management of selected pinelands. The County is seeking additional fire management assistance from Everglades National Park.

There has been no species-specific monitoring since 1999. Monitoring in the Miami-Dade pine rocklands is by Fairchild Tropical Botanic Garden, funded by grants managed by the Florida Endangered Plant Advisory Council for the Florida Department of Agriculture and Consumer Services. Recent information is not available for this plant on the only privately-owned site.

COORDINATION WITH STATES
Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment: The Florida Department of Agriculture and Consumer Services is advised by the Florida Endangered Plant Advisory Council, which reviews all the species on the Department's Regulated Plant Index. *Brickellia mosieri* has long been on the Index.

Indicate which State(s) did not provide any information or comments: N/A

LITERATURE CITED:

Bradley, K. A. and G. D. Gann. 1999. Status summaries of 12 rockland plant taxa in southern Florida. Report to U.S. Fish and Wildlife Service, South Florida Ecological Services Office, Vero Beach.

Chafin, L. G. J. C. Putnam Hancock, and G. Nelson. 2004. Field Guide to the Rare Plants of Florida, online edition. Florida Natural Areas Inventory. http://www.fnai.org/FieldGuide/pdf/Brickellia_mosieri.PDF. Accessed June 5, 2004.

Herndon, A. 1998. Life history studies of plants endemic to South Florida. Final report to the National Park Service under cooperative agreement number CA5280-5-9019. October 1, 1995 to April 30, 1998.

Institute for Regional Conservation. 2004. Floristic Inventory of South Florida Database. http://www.regionalconservation.org. Accessed June 6, 2004.

Kernan, C. and K. Bradley. 1996. Conservation survey of *Linum arenicola* in Dade County. A report to the U.S. Fish and Wildlife Service. Fairchild Tropical Garden, Miami, Florida.

Long, R. W. 1970. Additions and nomenclatural changes in the flora of southern Florida—I. Rhodora 72: 39 (*Kuhnia eupatorioides* var. *floridana*)

Long, R. W. and O. Lakela. 1971. A flora of tropical Florida; a manual of the seed plants and ferns of southern peninsular Florida. University of Miami Press, Coral Gables, Florida.

Shinners, L. 1971. Kuhnia L. transferred to Brickellia Ell. (Compositae). Sida 4(3): 274.

Small, J. K. 1933. Manual of the southeastern flora. University of North Carolina Press 1933. *Kuhnia mosieri* as a new species, p. 1508

Turner, B. L. 1989. An overview of the Brickellia (Kuhnia) eupatorioides (Asteraceae, Eupatoriae) complex. Phytologia 67(2): 130. (*Brickellia eupatorioides* var. *floridana*).

Wunderlin, R. P. and B. Hansen. 2003. Guide to the vascular plants of Florida, second edition+. University Press of Florida. 787 pp.

U.S. Census Bureau. State and Metropolitan Area Data Book 1997-1998.

U.S. Fish and Wildlife Service. 1999. South Florida multi-species recovery plan. Atlanta, Georgia. 2172 pp.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Jeffrey M. Fleming 11/16/2005
Acting Regional Director, Fish and Wildlife Service Date

Concur: _____ August 23, 2006
Acting Director, Fish and Wildlife Service Date

Do Not Concur: _____ _____
Director, Fish and Wildlife Service Date

Date of annual review: October 2005

Conducted by: South Florida (Vero Beach) Field Office